



## **NASA STTR 2012 Phase I Solicitation**

### **T2 In-Space Propulsion Technologies**

Includes all propulsion technologies required to deliver space missions from the surface of the Earth to Earth orbit or Earth escape, including solid rocket propulsion systems, liquid rocket propulsion systems, air breathing propulsion systems, ancillary propulsion systems, and unconventional/other propulsion systems. The Earth to orbit launch industry is currently reliant on very mature technologies, to which only small incremental improvements are possible. Breakthrough technologies are not on the near horizon, therefore research and development efforts will require both significant time and financial investments.

## **Subtopics**

### **T2.01 Space Power and Propulsion**

**Lead Center:** GRC

**Participating Center(s):** KSC

Development of innovative technologies are sought that will result in durable, long-life, lightweight, high performance space power and in-space propulsion systems to substantially enhance or enable future missions.

Innovations in the form of advanced concepts, technology demonstrations and processes are sought for Space Power and Propulsion.

Space Power areas of particular interest include solar photovoltaic, nuclear power, power distribution and transmission, conversion and regulation, batteries and fuel cells. Solar photovoltaic cell, blanket, and array technologies are sought for improved efficiency, power density, specific power and mass, and application to NASA-unique environmental conditions (high radiation, extreme temperatures, varying light intensity, etc.). Nuclear power technologies that provide high efficiency, high specific power, and long life for deep space and planetary surface applications including radioisotope power generation for power levels between 100 watts and 1 kilowatt and fission power generation for power levels from kilowatts to megawatts. Battery technologies include novel battery chemistries that offer improvements in safety, volume and mass above and beyond those offered by Lithium-ion technology. Fuel cell (and electrolyzer) technologies include novel membrane materials and geometries and advanced concepts. Power management and distribution technologies include modular "smart" systems and advanced materials and component research and development.

---

In-Space Propulsion areas of particular interest include electric propulsion, micro-propulsion, nuclear thermal propulsion, and propellant storage and transfer, which were identified as the highest priority ISP technologies by the NRC's "NASA Space Technology Roadmaps and Priorities." Technologies for electric propulsion include high-power long-lived thrusters and low specific mass power processing systems. Micro-propulsion technologies include chemical or non-chemical systems for micro-satellites. Technologies for nuclear thermal propulsion include advanced high temperature fuel forms, innovative testing methods and non-nuclear subsystems. Propellant technologies include subsystems and components to enable long-duration storage in space and low-gravity liquid transfer.